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10/033,308	10/24/2001	M. Parameswara Reddy	2058-181	8198

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PATENT LEGAL DEPARTMENT/A-42-C
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EXAMINER	
EPPERSON, JON D	
ART UNIT	**PAPER NUMBER**
1639	

DATE MAILED: 12/30/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/033,308	REDDY ET AL.	
	Examiner	Art Unit	
	Jon D. Epperson	1639	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *October 3, 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2,4-13,15,18,20-25,27,29 and 32-34* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,4-13,15,18,20-25,27,29 and 32-34* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Status of the Application

1. The Response filed October 3, 2005 is acknowledged.

2. The following office action is made non-final as the following rejections were not entirely necessitated by Applicants' amendments.

Status of the Claims

3. Claims 1-15, 18, 20-25, 27, 29 and 32-34 were pending. Applicants amended claims 1, 9-12, 18, 20, 27 and 29, and canceled claims 3 and 14. Therefore, claims 1, 2, 4-13, 15, 18, 20-25, 27, 29 and 32-34 are currently pending and examined on the merits.

Withdrawn Objections/Rejections

4. All previous rejections and/or objections are withdrawn in view of Applicants' arguments and/or amendments.

New Rejections and/or Objections

Objections to the Claims

5. Claim 11 is/ objected to because of the following informalities:

A. Claim is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form

or rewrite the claim(s) in independent form. Claim 11 depends from claim 10, which in turn depends on claim 9. Claim 9 recites in part: "step (b) occurs in an organic solution." Claim 11, on the other hand, recites the limitation "step (b) occurs in an aqueous solution." Claim 11, therefore, does not further limit claims 9 and 10.

Claims Rejections - 35 U.S.C. 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless -
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1, 2, 9, 12, 13, 18, 29 and 32 are rejected under 35 U.S.C. 102(b) as being anticipated by Jennissen et al. (Jennissen et al., "Biocoating of Implants with Mediator Molecules: Surface Enhancement of Metals by Treatment with Chromosulfuric Acid" Mat.-wiss. u. Werkstofftech. **1999**, 30, 838-845) as evidenced by Madsen (Madsen, N. B. "Modification and characterization of the interface in polymer/inorganic composites" Risø National Laboratory, 1999, pages 3-6) and Zumbrink et al. (Zumbrink, et al. "Analysis of Affinity Supports by 13C CP/MAS NMR spectroscopy: Application to Carbonyldiimidazole- and Novel Tresyl Chloride-Synthesized Agarose and Silica Gels" Journal of Molecular Recognition, **1995**, *8*, 363-373) and Bethell et al. (Bethell et al., "A Novel Method of Activation of Cross-linked Agaroses with 1,1'-Carbonyldiimidazole which Gives a Matrix for Affinity of Chromatography Devoid of Additional Charged Groups" *J. Biol. Chem.* **1979**, *254(8)*, 2572-2574) and FDA (U.S. Food and Drug Administration "InFuse™ Bond Graft/LT-CAGE™ Lumbar tapered Fusion Device –

P000058" September 2002, pages 1-3, accessed from

http://www.fda.gov/cdrh/mda/docs/p000058.pdf).

For ***claims 1 and 12***, Jennissen et al. (see entire document) disclose biocoating of implants with mediator molecules (e.g., see Jennissen et al., abstract), which anticipates the claimed invention. For example, Jennissen et al. disclose **(a)** providing a solid support comprised of an organic polymer having at least one available amino group including solid supports selected from the group consisting of plates and films (e.g., see page 840, last paragraph wherein Ti-APS is disclosed; see also page 840, column 2, paragraph 2 wherein "plates" are disclosed). In this scenario, the one available amino group is the terminal amine of the APS and the organic polymer is the cross-linked APS that is bound to the titanium solid support. The reference doesn't explicitly state that APS forms an organic polymer, but the Examiner contends that Jennissen et al. inherently discloses this feature as evidenced by Madsen (e.g., see Madsen, page 5, figure 1.2 showing polymerization of organosilanes and their subsequent attachment to free hydroxyl groups; see also Jennissen et al., page 840, column 2, paragraph 1). "When the PTO shows a sound basis for believing that the products of the applicant and the prior art are the same, the applicant has the burden of showing that they are not." *In re Spada*, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990). The Office does not have the facilities to make such a comparison and the burden is on the applicants to establish the difference. See *In re Best,* 562 F.2d 1252, 195 USPQ 430 (CCPA 1977) and *Ex parte Gray*, 10 USPQ 2d 1922 1923 (PTO Bd. Pat. App. & Int.). In addition, Jennissen et al. disclose **(b)** reacting the available amino group on the solid support with an activating

compound, the activating compound having the structure L_1-X-L_2 as defined in the claim (e.g., see page 840, column 2, paragraph 2 wherein CDI is used to form Ti-APS-CDI plates; CDI falls within the scope of L_1-X-L_2 when L_1 and L_2 are aryl and X is -C(=O)-). Jennissen et al. also disclose **(c)-(d)** providing a biological molecule having at least one reactive amino, thiol or hydroxyl group, the biological molecule being a macromolecule selected from the group consisting of nucleic acids, polypeptides chains and carbohydrates and reacting the biological molecule with the activated support, thereby displacing L2 and covalently attaching the biological molecule to the solid support (e.g., see page 840, column 2, last paragraph wherein ubiquitin is used to form Ti-APS-CDI-ubiquitin plates; see also page 841, column 1, paragraph 1 wherein rhBMP is used to form Ti-APS-CDI-rhBMP plates).

For ***claims 2 and 13***, Jennissen et al. disclose imidazole (e.g., see page 841, column 1, paragraph 1 wherein CDI is disclosed).

For ***claim 9***, Jennissen et al. do not explicitly disclose the use of an organic solvent but, instead, refer to the Zumbrink and Bethell publications for the CDI reaction conditions, which do disclose the use of organic solvents like dioxane (e.g., see page Jennissen et al., page 840, column 2, paragraph 1, "... activation by CDI [was accomplished] as described for Silica gel [14] [which refers to the Zumbrink reference]"; see also Zumbrink Materials and Methods and figure 4 which in turn refers to the Bethell et al. reference; see also Bethell et al., page 2572, Material and Methods which disclose the use of dioxane for activation).

For ***claim 18***, Jennissen et al. also disclose a washing step (e.g., see page 840, column 2, paragraph 2).

For ***claim 29***, Jennissen et al. do not explicitly state that they use a hormone, therapeutic drug or drug of abuse, but a therapeutic drug is inherently disclosed by Jennissen et al. as evidenced by the FDA, which provided approval for BMP-2 in treating degenerative disc disease (e.g., see Jennissen et al., page 838, abstract wherein BMP-2 is disclosed; see also FDA, page 1 wherein BMP-2 is approved to treat degenerative disc disease).

For ***claims 12 and 32***, Jennissen et al. disclose a plate or film (e.g., see page 840, last paragraph wherein Ti-APS is disclosed; see also page 840, column 2, paragraph 2 wherein "plates" are disclosed).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later

invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

9. Claims 1, 2, 4, 9-13, 15, 18, 29 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jennissen et al. (Jennissen et al., "Biocoating of Implants with Mediator Molecules: Surface Enhancement of Metals by Treatment with Chromosulfuric Acid" Mat.-wiss. u. Werkstofftech. 1999, 30, 838-845) in view of Stolowitz et al. (WO 87/06586) (Date of Publication is **November 5, 1987**) (of record) as evidenced by Madsen (Madsen, N. B. "Modification and characterization of the interface in polymer/inorganic composites" Risø National Laboratory, 1999, pages 3-6) and Zumbrink et al. (Zumbrink, et al. "Analysis of Affinity Supports by 13C CP/MAS NMR spectroscopy: Application to Carbonyldiimidazole- and Novel Tresyl Chloride-Synthesized Agarose and Silica Gels" Journal of Molecular Recognition, **1995**, *8*, 363-373) and Bethell et al. (Bethell et al., "A Novel Method of Activation of Cross-linked Agaroses with 1,1'-Carbonyldiimidazole which Gives a Matrix for Affinity of Chromatography Devoid of Additional Charged Groups" *J. Biol. Chem.* **1979**, *254(8)*, 2572-2574) and FDA (U.S. Food and Drug Administration "InFuse™ Bond Graft/LT-CAGE™ Lumbar tapered Fusion Device – P000058" September 2002, pages 1-3, accessed from http://www.fda.gov/cdrh/mda/docs/p000058.pdf).

For ***claims 1, 2, 9, 12, 13, 18, 29 and 32***, Jennissen et al. teach all the limitations stated in the 35 U.S.C. 102(b) rejection above (incorporated in its entirety herein by reference), which anticipates and, as a result, renders obvious claims 1, 2, 9, 12, 13, 18, 29 and 32.

The prior art teaching of Jennissen et al. differ from the claimed invention as follows:

For ***claims 4 and 15***, Jennissen et al. fail to disclose the use of 1,2,4-carbonyl di-triazole.

For ***claim 10***, Jennissen et al. fail to disclose the use of an organic base.

For ***claim 11***, Jennissen et al. fail to disclose aqueous conditions.

However, Stolowitz et al. teach the following limitations that are deficient in Jennissen et al.:

For ***claims 4 and 15***, Stolowitz et al. disclose, for example, 1,2,4-carbonyl di-triazole (e.g., see Stolowitz et al., page 10, paragraph 1, "A variety of azolides other ... may be employed ... include[ing] N,N'-carbonyldipyrazole, N,N'-carbonyldi-1,2,3-triazole, N,N'-carbonyldi-1,2,4-triazole, N,N'-carbonyldiindole, N,N,-carbonylidibenzimidazole and N,N'-carbonyldibenztriazole and others"; see also Stolowitz et al., abstract; see also page 9, formula 7 wherein the urea linkage is shown; see also Summary of Invention, "In addition, a number of important specific objectives are also achieved using the present invention, including: The use of N,N'-carbonyldiimidazole for the activation of a chromatographic support with other than pendant hydroxyl groups; The preparation of a urea derivative of a bonded phase chromatographic support and the unique hydrophilic nature of the urea linkage"; see also Example 1, lines 8-18; see also page 3, lines 14-20; see also page 3, lines 21-26).

For ***claim 10***, Stolowitz et al. disclose, for example, triethylamine (e.g., see Example 1).

For ***claim 11***, Stolowitz et al. disclose both aqueous and organic conditions (e.g., see Summary of Invention, "Derivatization results from reaction of the activated support with a functionalizing reagent consisting of a primary or secondary, alkyl or aryl amine in organic solvent, or from an aqueous solution of the amine or its salt").

It would have been prima facie obvious to one of ordinary skill in the art at the time the invention was made to use 1,2,4-carbonyl di-triazole as disclosed by Stolowitz et al. to immobilize BMP-2 as disclosed by Jennissen et al. because Stolowitz explicitly states that 1,2,4-carbonyl di-triazole can be used as a substituted for CDI in similar types of coupling reactions (e.g., see Stolowitz et al., page 10, paragraph 1, "A variety of azolides other than N,N'-carbonyl-diimidazole [i.e., the coupling agent used by Jennissen] may be employed ... include[ing] N,N'-carbonyldipyrazole, N,N'-carbonyldi-1,2,3-triazole, N,N'-carbonyldi-1,2,4-triazole, N,N'-carbonyldiindole, N,N,-carbonylidibenzimidazole and N,N'-carbonyldibenztriazole and others."). A person of skill in the art would have been motivated to use such a coupling reagent because the coupling reagents have similar structures and exhibit very similar properties to CDI (e.g., see page 10, paragraphs 1-2). Stolowitz et al. also state that they obtain "near quantitative derivatization of bonded supports ... by this synthetic route" (e.g., see Stolowitz et al., page 4, lines 29-30) and that their method is "versatile" because "almost [an] infinite variety of ligands ... can be employed as functionalizing reagents" (e.g., see Stolowitz et al., page 4, lines 34-35; see also Stolowitz et al., page 4, lines 23-25). In addition, Stolowitz et al. state that their method provides for a physical barrier that enhances the efficiency of the chromatographic procedures (e.g., see Stolowitz et al.,

page 4, lines 11-19, "The preparation of a physical barrier preventing interaction between surface silanols and sample components; The derivatization of the physical barrier preventing interaction between the hydrophobic silane backbone and sample components) and that the "urea" linkage has favorable properties (e.g., see Stolowitz et al., page, 7, first full paragraph, "The urea linkage ... is uncharged under normal chromatographic conditions and provides a hydrophilic barrier masking the properties of the silane backbone and the residual silanol activity beneath it"). Finally, a person of skill in the art would have reasonably expected to be successful because Stolowitz et al. shows the use of 1,2,4-carbonyl di-triazole in a coupling reaction involving aminopropyl silica gel (e.g., see abstract; see also Summary of Invention; see also Examples) which is exactly the same reaction disclosed by Jennissen et al. (e.g., see Jennissen et al., column 2, paragraph 1). In addition, Stolowitz et al. also state, "almost [an] infinite variety of ligands ... can be employed as functionalizing reagents" (e.g., see Stolowitz et al., page 4, lines 34-35).

10. Claims 1, 2, 4-13, 15, 18, 20-25, 27, 29 and 32-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jennissen et al. (Jennissen et al., "Biocoating of Implants with Mediator Molecules: Surface Enhancement of Metals by Treatment with Chromosulfuric Acid" Mat.-wiss. u. Werkstofftech. 1999, 30, 838-845) and Stolowitz et al. (WO 87/06586) (Date of Publication is **November 5, 1987**) (of record) and Milton (US 6,146,833) (of record) and Okamoto et al. (US 6,476,215) (of record) and Guo et al. (Nuc. Acids Res. 1994, pp. 5456-5465) (of record) as evidenced by Madsen (Madsen, N. B. "Modification and characterization of the interface in

polymer/inorganic composites" Risø National Laboratory, 1999, pages 3-6) and Zumbrink et al. (Zumbrink, et al. "Analysis of Affinity Supports by 13C CP/MAS NMR spectroscopy: Application to Carbonyldiimidazole- and Novel Tresyl Chloride-Synthesized Agarose and Silica Gels" Journal of Molecular Recognition, **1995**, *8*, 363-373) and Bethell et al. (Bethell et al., "A Novel Method of Activation of Cross-linked Agaroses with 1,1'-Carbonyldiimidazole which Gives a Matrix for Affinity of Chromatography Devoid of Additional Charged Groups" *J. Biol. Chem.* **1979**, *254(8)*, 2572-2574) and FDA (U.S. Food and Drug Administration "InFuse™ Bond Graft/LT-CAGE™ Lumbar tapered Fusion Device – P000058" September 2002, pages 1-3, accessed from http://www.fda.gov/cdrh/mda/docs/p000058.pdf).

For ***claims 1, 2, 4, 9-13, 15, 18, 29 and 32***, the combined references of Jennissen et al. and Stolowitz et al. teach all the limitations stated in the 35 U.S.C. 103(a) rejection above (incorporated in its entirety herein by reference), which renders obvious claims 1, 2, 4, 9-13, 15, 18, 29 and 32.

For ***claim 21***, Jennissen et al. and Stolowitz et al. teach a "washing" step (e.g., (e.g., Jennissen et al., see page 840, column 2, paragraph 2).

The prior art combined teachings of Jennissen et al. and Stolowitz et al. differ from the claimed invention as follows:

For ***claims 5, 6, 22-23***, the prior art teachings of Jennissen et al. and Stolowitz et al. fail to recite the deposition of compounds in a particular area on the support (e.g., using inkjet printing).

For ***claims 7, 8, 24***, the prior art teachings of Jennissen et al. and Stolowitz et al. fail to recite the use of a humid chamber.

For ***claims 20, 27 and 33***, the prior art teachings of Jennissen et al. and Stolowitz et al. fail to recite a solid support selected from the group consisting of cellulose, agarose, polypropylene, polystyrene, polymethacrylate, and nylon.

For ***claims 25 and 34***, the prior art combined teachings of Jennissen et al. and Stolowitz et al. fail to recite the use of an amino derivatized oligonucleotide.

However, the combined references of Milton et al. Okamoto et al. and Guo et al. teach the following limitations that are deficient in Jennissen et al. and Stolowitz et al.:

For ***claims 5, 6, 22-23***, However, the use of printing techniques to deposit biological compounds onto solid supports was well established in the art at the time of filing, (e.g., see for example, Milton et al. column 12, lines 24-41; see also column 8, line 33; see also column 11, line 62; see also column 17, line 2; see also Guo et al., page 5457, column 1; see also Okamoto et al., columns 1-3). The reference teaches methods for printing compounds to make an array (e.g., see Milton, Examples 5 and 6 wherein spot diameter is, for example, 250 μm; note this procedure is *referred to in the instant specification,* pages 9 and 10; see also Milton, Examples 3-9 wherein immobilization of oligonucleotides and peptides is taught).

For ***claims 7, 8 and 24***, the combined references of Milton, Okamoto et al. and Guo et al further teach a humid chamber during the attachment of the probes to their arrays (e.g., see Guo, page 5457, column 1; see also Okamoto et al., column 18, lines 42-46). This step is used to complete the reaction and/or to incubate the arrays.

For ***claims 20, 27 and 33***, the combined references of Milton, Okamoto et al. and Guo et al. disclose, for example, polypropylene including "aminated" polypropylene

(e.g., see Milton, column 2, line 5; see also column 6, last paragraph; see also figures 1, 6, 10, 14; see also Examples; see also claims 2, 4, 8 and 11; see also figures 1-7; see also column 2, lines 5-8 wherein glass slides, polymer films, silicon wafers are disclosed; see also column 2, lines 47-50; see also column 3, line 4; and claim 23).

For ***claim 21***, the combined references of Milton, Ocamoto et al. and Guo et al. also disclose a "washing" step (e.g., see Example 5).

For ***claims 25 and 34***, the combined references of Milton, Okamoto et al. and Guo et al. further teach the use of amino derivatized oligonucleotides with one free amino (e.g., see Milton, Detailed Description of Invention, "For example, designed DNA libraries consisting of site-specific arrays of oligonucleotides of known sequence immobilized to a solid support surface have utility in detecting individual genetic mutations using reverse hybridization techniques"; see also columns 10-11, "The following shows a generalized reaction between an amino derivatized oligonucleotide and a solid support surface").

It would have been *prima facie* obvious to one of ordinary skill in the art at the time of the invention to use the carbonyl diimidazole (CDI) immobilization chemistry and related compounds such as 1,2,4-carbonyl di-triazole as taught by the combined references of Jennissen et al. and Stolowitz et al. in an array-type format using a "printing method" to deliver the amine compound (e.g. oligonucleotides or peptides) as taught by Milton, Guo and Okamoto because "immobilization" of biomolecules is required in each case (i.e., the references represent analogous art). One of ordinary skill would have been motivated to do so due in order to create covalently attached amine bound biomolecules

"immobilized at site specific locations" as taught by Milton (for example). In addition, a person of skill in the art would have been motivated to use a "humid chamber" to complete the reaction and/or to incubate the arrays once created.

In addition, it would have been obvious to one of ordinary skill in the art at the time the invention was made to immobilize affinity ligands in an array format for analytical and diagnostic purposes as taught by the combined references of Milton, Okamoto et al. and Guo et al. (e.g., see Milton et al., abstract) using the CDI immobilization procedures as taught by the combined references of Jennissen et al. and Stolowitz et al. because Stolowitz et al., for example, explicitly state that CDI can be used for this purpose (e.g., see Stolowitz, column 6, lines 43-56, "An 'affinity ligand' ... may also be used as a diagnostic reagent ... [which] permits the detection and/or quantitation of such biological molecules"; see also lines 23-26, "'the chromatographic material containing the affinity ligand may comprise ... the inner surface of a microtitre plate [i.e., an array]"). Furthermore, one of ordinary skill in the art would have been motivated to use the CDI immobilization techniques as taught by the combined teachings of Jennissen et al. and Stolowitz et al. because Stolowitz et al., for example, explicitly state that they obtain "near quantitative derivatization of bonded supports ... by this synthetic route" (e.g., see Stolowitz et al., page 4, lines 29-30). Stolowitz et al. also state that their method is "versatile" because "almost [an] infinite variety of ligands ... can be employed as functionalizing reagents" (e.g., see Stolowitz et al., page 4, lines 34-35). In addition, the combined references of Jennissen et al. and Stolowitz et al. state that their method provides for a physical barrier that decreases non-specific binding that might

otherwise interfere with an analytical and/or diagnostic assay (e.g., see Stolowitz et al., page 4, lines 11-19, "The preparation of a physical barrier preventing interaction between surface silanols and sample components; The derivatization of the physical barrier preventing interaction between the hydrophobic silane backbone and sample components; and the functionalization of the physical barrier to impart properties resulting in selective retention of sample components"; see also page 7, first full paragraph, "The urea linkage ... is uncharged under normal chromatographic conditions and provides a hydrophilic barrier masking the properties of the silane backbone and the residual silanol activity beneath it"), which the combined teachings of Milton, Okamoto et al. and Guo et al. recognize as being "crucial" for the proper operation of their diagnostic arrays (e.g., see Milton, column 6, lines 38-43, "This [non-specific binding] is an important consideration because diagnostic applications which depend upon detecting reagents specifically bound to biopolymers immobilized to solid supports cannot tolerate nonspecific binding to the solid support").

Finally, one of ordinary skill in the art would have reasonably expected to be successful because Stolowitz et al. also state, "almost [an] infinite variety of ligands ... can be employed as functionalizing reagents" and Jennissen et al. provide a specific example of a protein, which would encompass the proteins disclosed by Milton (see Milton, column 11, lines 28-30, "Similarly any protein or peptide with surface amino groups, e.g. lysine can be immobilized to a solid support"; see also Stolowitz et al., page 4, lines 34-35). In addition, all references teach the use of CDI for immobilization (e.g., compare Jennissen et al. (e.g., page 840, column 2, paragraph 1 wherein CDI is

disclosed) to Milton (e.g., see column 8, lines 37-55, "In another aspect, the present invention provides methods for preparing reagents for immobilizing biopolymers which include providing a solid support fabricated of ethylene acrylic acid copolymer or ethylene methacrylic acid copolymer and derivatizing at least one surface of the solid support by reacting the surface with an activating agent. Suitable activating agents are ... carbodiimides"; see also Example 9 wherein the use of diisopropylcarbodiimide is disclosed).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jon D Epperson whose telephone number is (571) 272-0808. The examiner can normally be reached Monday-Friday from 9:00 to 5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Andrew Wang can be reached on (571) 272-0811. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (571) 272-1600. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jon D. Epperson, Ph.D.
December 27, 2005